Passive monitoring of IEEE-1355/SpaceWire links

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Abstract

A system for monitoring and logging messages and link status on SpaceWire (IEEE-1355) communications links is presented. SpaceWire is a high speed (>100 Mbps) serial point to point link for spacecraft use based on the IEEE-1355 specification. Two systems are described. The monitoring is useful during system development and prototyping, in a manner similar to the commonly available serial line monitors used on RS-232 serial connections.

The first, simplified, system presented uses commercially available off the shelf 4Links SpaceWire-PCI interface cards and its NT device driver to monitor the messages and link status in both directions. The monitor is implemented with a simple hardware "tap" and with two of the three link ports on the 4Links card, which is based on the SMCS332 IEEE-1355 interface ASIC. A more sophisticated logical design based on a FPGA for a more complete IEEE-1355 link monitor, which allows analysis of the fine grain link behavior and does not require the SMCS332 ASIC is also presented.

Results of the successful testing the monitoring system to the full speed available on the 4links card are presented. Results are also presented of the use of the monitoring system as being used in development of a multiple DSP processor system based on the Astrium MCMDSP modules, which integrate an ADSP21020 and SMCS332.